学术报告

A spectral element method and its application

王汉权 教授

云南财经大学

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Abstract： I mainly discuss collocation-based spectral element method for the boundary value problem of the elliptic equations. There are few literature on how to implement collocation-based spectral element method for the elliptic problems. I describe how to apply the continuous collocation-based spectral element method to numerically solve the boundary value problems of the elliptic equations. Firstly, the method constructed here uses the idea of the finite element method to decompose the domain of the equation, and divides the domain into several connected subdomains. Secondly, it uses the collocation-based method to discretize the elliptic equations in each subdomain. Thirdly, using the ideology of the finite element method assembles the unit stiffness matrix into a total stiffness matrix. Finally, the numerical solution of the unknown function can be found from the discretized system. This method can be used to deal with complicated elliptic equations with the variable coefficients. It can also solve the numerical solutions of the boundary value problems for the elliptic equations defined in complex regions. Another benefit of the method lies on that it can achieve comparably simple programming. This is undoubtedly a value of this method. Extension of the numerical method to investigate the elliptic boundary value problem with singular solution and how to solve the time-dependent nonlinear Schrodinger equation will be discussed. Hints for constructing nodal continuous/ discontinuous nodal Galerkin spectral methods are suggested too.

欢迎大家参加！